

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,993,156 B1  
APPLICATION NO. : 09/504022  
DATED : January 31, 2006  
INVENTOR(S) : Richard S. Szeliski et al.

Page 1 of 3

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Pg. Item (56), under "Other Publications", line 7, delete "p." and insert -- pp. --, therefor.

On the Title Pg. Item (56), under "Other Publications", line 13, delete "9ICCV'98)," and insert -- 9ICCV'98, --, therefor.

On the Title Pg. Item (56), under "Other Publications", line 17, after "parametrics" delete "," and insert -- . --, therefor.

In column 2, line(s) 47-55, delete "Alternatively, an RGB or RGBA image can represent a three or four dimensional vector field defined over a subset of the plane. Consequently, highly parallelized calculations can be performed on entire functions or vector fields directly within the graphics hardware of a conventional computer graphics card or the like. Such uses of conventional graphics hardware for performing these types of computations have been well known to those skilled in the art for a number of years." and insert -- Alternatively, an RGB or RGBA image can represent a three or four dimensional vector field defined over a subset of the plane. Consequently, highly parallelized calculations can be performed on entire functions or vector fields directly within the graphics hardware of a conventional computer graphics card or the like. Such uses of conventional graphics hardware for performing these types of computations have been well known to those skilled in the art for a number of years. --, therefor, on line 48 as a new paragraph.

In column 5, line 54, after "data" delete "is".

In column 8, line 17, after "408." delete "The" and insert -- In one embodiment, the --, therefor.

In column 8, line 18, delete "can store" and insert -- then stores --, therefor.

In column 8, line 19, delete "can be" and insert -- is --, therefor.

In column 8, line 26, delete "can be" and insert -- is --, therefor.

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In column 8, line 26, after “accomplished” insert -- using a statistics/comparison device 418 in combination --.

In column 8, line 27, delete “which will be” and insert -- as --, therefor.

In column 8, line 37, after “v<sub>2</sub>” delete “,”.

In column 8, line 38, after “sy” delete “,”.

In column 8, line 44, after “in” insert -- the --.

In column 8, line 61, after “412” delete “,”.

In column 9, line 16, delete “These” and insert -- The --, therefor.

In column 9, line(s) 51-59, delete

$$\text{“} \frac{\text{covariance}(I, T)}{\sigma_I \sigma_T} = \frac{\sum_x \sum_y (T(x, y) - \mu_T)(I(x - u, y - v) - \mu_I)}{\sqrt{\sum_x \sum_y (I(x - u, y - v) - \mu_I)^2 \sum_x \sum_y (T(x, y) - \mu_T)^2}} \text{”}$$

and insert -- 
$$\frac{\text{covariance}(I, T)}{\sigma_I \sigma_T} = \frac{\sum_x \sum_y (T(x, y) - \mu_T)(I(x - u, y - v) - \mu_I)}{\sqrt{\sum_x \sum_y (I(x - u, y - v) - \mu_I)^2 \sum_x \sum_y (T(x, y) - \mu_T)^2}} \text{--},$$

therefor.

In column 11, line 12, after “α” delete “,”.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 12, line(s) 19-32, delete "In one specific embodiment of the example of FIG. 5, the template is treated as a texture and the frame buffer an image and the display primitive for rendering purposes is a triangular polygon. In addition, instead of rasterizing the texture into the frame buffer, certain statistics are recorded for normalized correlation or other statistics can be recorded for various embodiments. In one example, if the texture is considered a template and the frame buffer an image, the graphics processor 513 is used to resample the template using a perspective transformation. Also, the statistics/comparison device 518 of the modified graphics

processor 513 is used to record statistics ( $\Sigma T$ ,  $\Sigma I$ ,  $\Sigma IT$ ,  $\Sigma T^2$ ,  $\Sigma I^2$  for normalized

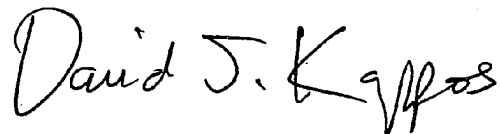
correlation, or other statistics for a variation) for later forwarding to the host processor." and insert -- In one specific embodiment of the example of FIG. 5, the template is treated as a texture and the frame buffer an image and the display primitive for rendering purposes is a triangular polygon. In addition, instead of rasterizing the texture into the frame buffer, certain statistics are recorded for normalized correlation or other statistics can be recorded for various embodiments. In one example, if the texture is considered a template and the frame buffer an image, the graphics processor 513 is used to resample the template using a perspective transformation. Also, the statistics/comparison device 518 of the modified graphics processor 513 is used to

record statistics ( $\Sigma T$ ,  $\Sigma I$ ,  $\Sigma IT$ ,  $\Sigma T^2$ ,  $\Sigma I^2$  for normalized correlation, or other statistics

for a variation) for later forwarding to the host processor. --, therefor, on line 20 as a new paragraph.

Signed and Sealed this

Twenty-ninth Day of September, 2009



David J. Kappos  
*Director of the United States Patent and Trademark Office*